

Tsunamigenic mega-slides on the southern Oregon Cascadia Margin

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Abstract. Using SeaBeam bathymetry and seismic reflection data, we have identified three large submarine landslides on the southern Oregon Cascadia margin. The area enclosed by the three arcuate slide scarps is approximately 8000 km², and involves an estimated 12,000 km³ of the accretionary wedge. Regions of the continental slope enclosed by the scarps are chaotic, with poor penetration of seismic energy and numerous diffractions, and little structural coherence, in strong contrast to the fold thrust belt tectonics of the adjacent northern Oregon margin. The bathymetric scarps correlate with listric detachment faults identified on reflection profiles that reveal large vertical separations and bathymetric relief. Reflection profiles on the adjacent abyssal plain image buried debris extending 20–35 km seaward of the base of the continental slope. The ages of these events are approximately 110 ka, 450 ka, and 1210 ka. The lack of internal structure in the slide packages, and the considerable distance traveled suggests catastrophic rather than incremental slip, although there could have been multiple events. The slides would have generated large tsunamis in the Pacific basin. We have identified a detached block off southern Oregon that may be released in a future slide.

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